REMARKS

Examiner's Rejections and Objections

The foregoing Amendment and remarks which follow are responsive to the Office Action mailed September 21, 2001. In that Office Action, Claims 1, 3, 4, 6, 8 and 9 were rejected under 35 U.S.C. §102(b) as being anticipated by Rostoker et al. (U.S. Patent No. 5,729,535). Claims 2 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rostoker et al. in view of Rautiola et al. (U.S. Patent No. 5,991,639). Claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Rostoker et al. in view of Obradovich et al. (U.S. Patent No. 6,148,261).

The Specification was objected to due of the following informality: the reference numeral "74" in line 24 of page 10 should be –76–. This correction has been made by the above-directed amendment.

The Office Action also objected to Claim 6 stating that the word "first" in line 24 should be changed to -second-. Claim 6 has been amended. Thus, this objection is no longer applicable.

Summary of Applicants' Response

Applicants have amended the specification to correct the typographical error noted in the Office Action, as well as a few other typographical errors noted by Applicants. No new matter has been added. Additionally, Applicants have amended Claims 1 and 6 to more clearly recite the novel aspects of the present invention. Specifically, the claims have been amended to recite a single conductor signal path connecting the first and second modules to facilitate bi-

directional communications therebetween. As described in the following remarks, the Claims after this amendment are patentably distinct to the cited references and are, therefore, allowable. Reasons why the Claims are patentably distinct are provided following a brief summary of Applicants' invention.

Applicants' Present Invention

Applicants' invention is directed to an infrared communications scheme for use in an embedded system. Unlike traditional IrDA setups (such as the one shown in Figure 2) in which modules communicate over an air medium, the present invention employs a modified IrDA setup (such as is shown in Figures 3 and 4) in which modules transmit and receive data via a single conductor signal path which connects the modules to facilitate bi-directional communications therebetween. The single conductor signal path eliminates the need for line-of-sight alignment between LED and photodiodes particularly utilized in IrDA schemes, and likewise minimizes power consumption, which are known to be high in conventional IrDA schemes when transmitting signals via LED transmitters. Page 9, lines 4-12.

Furthermore, the single wire connections utilized in the electrical interface implementation of IrDA of the present invention allows a redundancy of connections which may be utilized to transmit the same data over multiple configurations. Thus, the IrDA electrical interface configuration of the present invention has an increased reliability as compared to conventional single line hard-wire connections. Page 9, lines 13-23.

Reasons Why the Claims in the Present Application are Patentably Distinct from the Cited

References

Claims 1, 3, 4, 6, 8 and 9 were rejected under 35 U.S.C. §102(b) as being anticipated by Rostoker et al. Applicants' invention claims a shock-resistant system for operatively connecting modules within a computer system to enable data to be transmitted and received therebetween. The system includes: a first and second module, with each module having at least one tri-stateable digital transmitter element and at least one digital receiver element, the module substantially conforming to a standardized infrared communications scheme protocol and **a single conductor signal path connecting the first and second modules to facilitate bi-directional communications therebetween**. emphasis added. With reference to Figure 3, the output of transmitter 44 (in the first module) is wired directly to the input of the receiver 48 (in the second module), and the output of transmitter 50 (in the second module "B") is wired directly to the input of the receiver 46 (in the first module).

There is no wireless communication between the modules. This would be a much more complex approach due to interference between the differing signals to and from the various modules. The present invention employs the infrared communication scheme for transmitting data serially over a single wire as opposed to a multiplicity of parallel wires. This increases the probability of a correct transmission and substantially increases the reliability as compared to parallel connections. The speed of the infrared communication scheme is comparable to the speed of a multi-wire parallel operation.

The cited references are directed to wireless communication between components or modules and are deemed not relevant to Applicants' invention.

The Rostoker et al. reference (U.S. Patent No. 5,729,535) discloses a system for **wireless**

communication. Rostoker et al. discloses that an existing computer can be configured for **wireless** communications by inserting into its backplate a board including a transceiver. emphasis added.

The cited and applied reference does not teach or suggest a system having two modules substantially conforming to a standardized infrared communications scheme protocol and a single conductor signal path connecting the first and second modules to facilitate bi-directional communications therebetween. Thus, independent Claims 1 and 6 are patentably distinct over the cited reference.

Because independent Claims 1 and 6 are patentable, dependent Claims 2-5 and 7-9 are also patentable.

Conclusion and Request for Allowance

On the basis of the foregoing, Applicant respectfully submits that all the stated grounds of objections and rejections have been overcome, and that all the pending claims (1-9) are in condition for allowance. Entry of the proposed amendment and an early Notice of Allowance is therefore respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made." Should the Examiner have any suggestions for expediting allowance of the application, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

If any additional fee is required, please charge Deposit Account Number 14-1325.

Respectfully submitted,

Date: 12/21/01

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the specification:

Paragraph beginning at line 16 of page 6 has been amended as follows:

Referring now to the figures, initially to Fig. 1, there is shown an exploded view of an environment enclosure 10 for housing a computer system for use in running embedded applications in severe environments. As is well-known to those skilled in the art, such enclosures 10 are capable of withstanding extreme environmental conditions, such as maximum extremes of shock, vibration, temperature, EMI, humidity, as well as sand, dust, and the like. Such containers are particularly effective in running embedded applications, which are defined as a specific function which is contained within a larger application requiring no human intervention beyond supplying power to the computer (not shown) housed therewithin. For example, embedded applications include but are not limited to, systems and process control, communications, navigation, and surveillance.

Paragraph beginning at line 32 of page 6 has been amended as follows:

The computer systems utilized to run such applications typically comprise a plurality of circuit boards or daughter cards, such as 12, that are affixed about a backplane 16 rigidly mounted within the enclosure. In this respect, the backplane is provided with a plurality of connectors 18 for supporting a plurality of circuit cards in a generally parallel, upright relationship. The backplane 16 also supports the power supply (not shown), which is typically located within such

enclosure 10, to thus provide power for the computer system to function.

Paragraph beginning at line 17 of page 7 has been amended as follows:

To address such problems, there is provided herein a novel communications scheme by which circuit cards can be interconnected to one another to transmit and receive data that eliminates the foregoing drawbacks. In this respect, there is provided herein an infrared communications scheme utilizing an electrical interface that interconnects the plurality of circuit cards of an embedded computer system to thus enable data to be received and transmitted therebetween. In this respect, each respective one of the plurality of the circuit cards is provided with a dedicated pairs of buffered digital transceivers electrically connected to one another that enable data signals to be transmitted and received therebetween.

Paragraph beginning at line 15 of page 8 has been amended as follows:

Advantageously, IrDA standards are ideally recommended for high speed, short range, line of sight, point-to-point cordless data transfer, which are typically utilized in a widespread commercial applications for personal computers, digital cameras, hand-held data collection devices, and the like. A more detailed outline of the standards and protocols designed and developed by the IrDA may be obtained from the Infrared Data Association based in Walnut Creek, California. Alternatively, such data may be obtained via the IrDA's website at http:\\www.irda.org\standards \standards.asp, the teachings of which are expressly incorporated herein by reference.

Paragraph beginning at line 28 of page 8 has been amended as follows:

As will be appreciated by those skilled in the art, the use of standardized IrDA infrared communications schemes currently can enable data to be received and transmitted at rates up to four megabiytes per second (4 Mbps), which is substantially equivalent, if not faster, than conventional hard-wired systems. It is further contemplated that developments may soon be made which can support data transfer rates in excess of sixteen megabiytes per second (16 Mbps).

Paragraph beginning at line 12 of page 10 has been amended as follows:

Fig. 4 depicts a second example of how an IrDA electrical interface may be implemented according to a preferred embodiment of the present invention. As illustrated, first and second modules 60, 62 representing circuit boards are provided that each include two output-transmitting tri-stateable digital buffers, 64 and 68 on first module 60, and 74, 78 of second module 62, and two input or digital receivers 66 and 70 on first module, and 72 and ~~74~~76 on second module 62. The respective pairs of buffers and receivers 64, 66, and 68, 70 on first module ~~70~~60 and 72, 74, and 76, 78 on second module 62, are arranged such that each respective output or transmitter element is electrically interconnected to a respective input or receiver element formed on the respective other module.

Paragraph beginning at line 26 of page 10 has been amended as follows:

Control is invoked over each transmitter element pair 44, 50 or 64, 74 or 68, 78 such that they are prevented from transmitting simultaneously and ~~this~~thus contending for access to the same

physical line. This control is implemented via the tri-state control input on each transmitter element. The media access control logic inherent to the ~~IrdA~~ IrDA protocol handles collision detection and trys on a given data line.

In the claims:

Claims 1 and 6 have been amended as follows:

1. (Amended) A shock-resistant system for operatively interconnecting modules within a computer system to enable data to be transmitted and received therebetween comprising:

a. a first module having at least one tri-stateable digital transmitter element formed thereon for transmitting data from said first module, said first module having at least one digital receiver element formed thereon for receiving data for said first module, said data transmitted and received by said first module substantially conforming to a standardized infrared communications scheme protocol;

b. a second module having at least one tri-stateable digital transmitter element formed thereon for transmitting data from said second module, said second module having at least one digital receiver element formed thereon for receiving data for said second module, said data transmitted and received by said second module substantially conforming to said standardized infrared communications scheme protocol utilized by said first module; and

c. ~~wherein said at least one transmitting element of said first module is electrically interfaced with said at least one receiver element of said second module and said at least one transmitting element of said second module is electrically interfaced to said at least~~

~~one receiver element of said first module such that said at least one transmitter element on said first module is operative to transmit a signal to said at least one receiving element on said second module and said at least one transmitter element of said second module is operative to transmit a digital signal to said at least one receiver element of said first module~~a single conductor signal path connecting said first and second modules to facilitate bi-directional communications therebetween.

6. (Amended) A method for operatively interconnecting modules within a computer to enable data to be transmitted and received therebetween comprising:

a. providing a first module having at least one transmitter element and at least one receiver element formed thereon, said data transmitted and received by said first module substantially conforming to a standardized infrared communications scheme protocol;

b. providing a second module having at least one transmitter element and at least one receiver element formed thereon, said data transmitted and received by said second module substantially conforming to a standardized infrared communications scheme or protocol; and

c. ~~electrically interfacing said first module with said second module such that at least one transmitting element of said first module is electrically interfaced with said at least one receiving element of said second module and said at least one transmitting element of said second module is electrically interfaced to said at least one receiving element of said first module such that said at least one transmitter element on said first module is operative to transmit a signal to said receiver on said first module and said at least one~~

~~transmitter element of said second module is operative to transmit a signal to said at least one receiver of said first module~~communicating between the first and second modules via a single bi-directional communication path using the standardized infrared communications scheme protocol.

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